

EXHIBIT L

LITHIUMHUB’S INFRINGEMENT ANALYSIS
U.S. Patent No. 9,954,207 – RELiON RB100-HP

Independent Claims 1 and 12




Lithium Hub provides evidence of infringement of independent claims 1 and 12 of U.S. Patent No. 9,954,207 (hereinafter “the ’207 patent”) by RELiON. In support thereof, Lithium Hub provides the following claim charts.

“Accused Products” as used herein refers to at least RELiON RB100-HP and the Accused Products enumerated in the Complaint. These claim charts demonstrate RELiON’s infringement by comparing each element of the asserted claims to corresponding components, aspects, and/or features of the Accused Products. These claim charts are not intended to constitute an expert report on infringement. These claim charts include information provided by way of example, and not by way of limitation.

Unless otherwise noted, LithiumHub contends that RELiON directly infringes the ’207 patent in violation of 35 U.S.C. § 271(a) by selling, offering to sell, making, using, and/or importing the Accused Products. *See, e.g.*, RELiON website (available at: <https://www.relionbattery.com/products/lithium/rb100-hp>). The following exemplary analysis demonstrates that infringement. Unless otherwise noted, LithiumHub further contends that the evidence below supports a finding of indirect infringement under 35 U.S.C. §§ 271(b) and/or (c), in conjunction with other evidence of liability under one or more of those subsections. RELiON makes, uses, sells, imports, or offers for sale in the United States, or has made, used, sold, imported, or offered for sale in the past, without authority, or induces others to make, use, sell, import, or offer for sale in the United States, or has induced others to make, use, sell, import, or offer for sale in the past, without authority products, equipment, or services that infringe claims 1 and 12 of the ’207 patent, including without limitation, the Accused Products.

Unless otherwise noted, LithiumHub believes and contends that each element of each claim asserted herein is literally met through RELiON’s provision of the Accused Products. However, to the extent that RELiON attempts to allege that any asserted claim element is not literally met, LithiumHub believes and contends that such elements are met under the doctrine of equivalents. More specifically, in its investigation and analysis of the Accused Products, LithiumHub did not identify any substantial differences between the elements of the patent claims and the corresponding features of the Accused Products, as set forth herein. In each instance, the identified feature of the Accused Products performs at least substantially the same function in substantially the same way to achieve substantially the same result as the corresponding claim element.

To the extent the chart of an asserted claim relies on evidence about certain specifically identified Accused Products, LithiumHub asserts that, on information and belief, any similarly functioning Accused Product also infringes the charted claim. LithiumHub reserves the right to amend this infringement analysis based on other products made, used, sold, imported, or offered for sale by RELiON. LithiumHub further reserves the right to amend this infringement analysis by adding, subtracting, or otherwise modifying content in the “Accused Products” column of each chart.

US9,954,207 Claim Element	Relion (RELiON RB100-HP)
Claim 1	
<p>[1p]</p> <p>A battery pack having positive and negative terminals for powering an electric motor for starting an internal combustion engine in which the electric motor is in a 6 volt to 48 volt operating system, said battery pack comprising:</p>	<p>To the extent the preamble is limiting, the RELiON RB100-HP is a battery pack having positive (10) and negative terminals (11).</p>   

US9,954,207 Claim Element**Relion (RELiON RB100-HP)**

To the extent the preamble is limiting, the RELiON RB100-HP may be used for powering an electric motor for starting an internal combustion engine in which the electric motor is in a 6 volt to 48 volt operating system.

**4.5. Battery Orientation**

- Lithium batteries can be placed upright or on their sides.
- Do not install batteries in a zero-clearance compartment, overheating may result. Always leave at least 4" of space around all sides and top of battery.
- Keep any flammable/combustible material (e.g., paper, cloth, plastic, etc.) that may be ignited by heat, sparks, or flames at a minimum distance of two feet away from the batteries.
- Battery compartment and any material within two feet should be noncombustible.

4.6. Series or Parallel Connections

When connecting batteries in series or parallel, please follow these guidelines:

(1) Make sure each battery is within 50mV (0.05V) of each other before putting them in service. This will minimize the chance of imbalance between batteries. If your batteries get out of balance, the voltage of any battery is >50mV (0.05V) from another battery in the set, you should charge each battery individually to rebalance.

(2) Size batteries in parallel accordingly: The capacity of batteries (rated in amp-hours) when connected in parallel is increased by the multiple of the batteries connected (2x, 3x, 4x, etc). However, the current ratings (discharge and charge) for parallel batteries is only increased by 75% of the multiple of the batteries connected (1.5x, 2.25x, 3x, etc).

(3) Batteries connected in series are best charged as individual batteries. charging as a series bank can lead to imbalances and reduced runtime, requiring an occasional individual balancing charge.

(4) Please reference RELiON's LiFePO4 Charging Instructions document (available on our website at reliionbattery.com) for series and parallel charging.

Specifications for Batteries in Parallel				
Battery Quantity	v	2	3	4
Voltage	12.8	12.8	12.8	12.8
Capacity (Ah)	100	200	300	400
Max Continuous Discharge Current	100	150	225	300
Peak Discharge Current	200	300	450	600
Rec'd Charge Current	50	75	113	150
Max Charge Current	100	150	225	300

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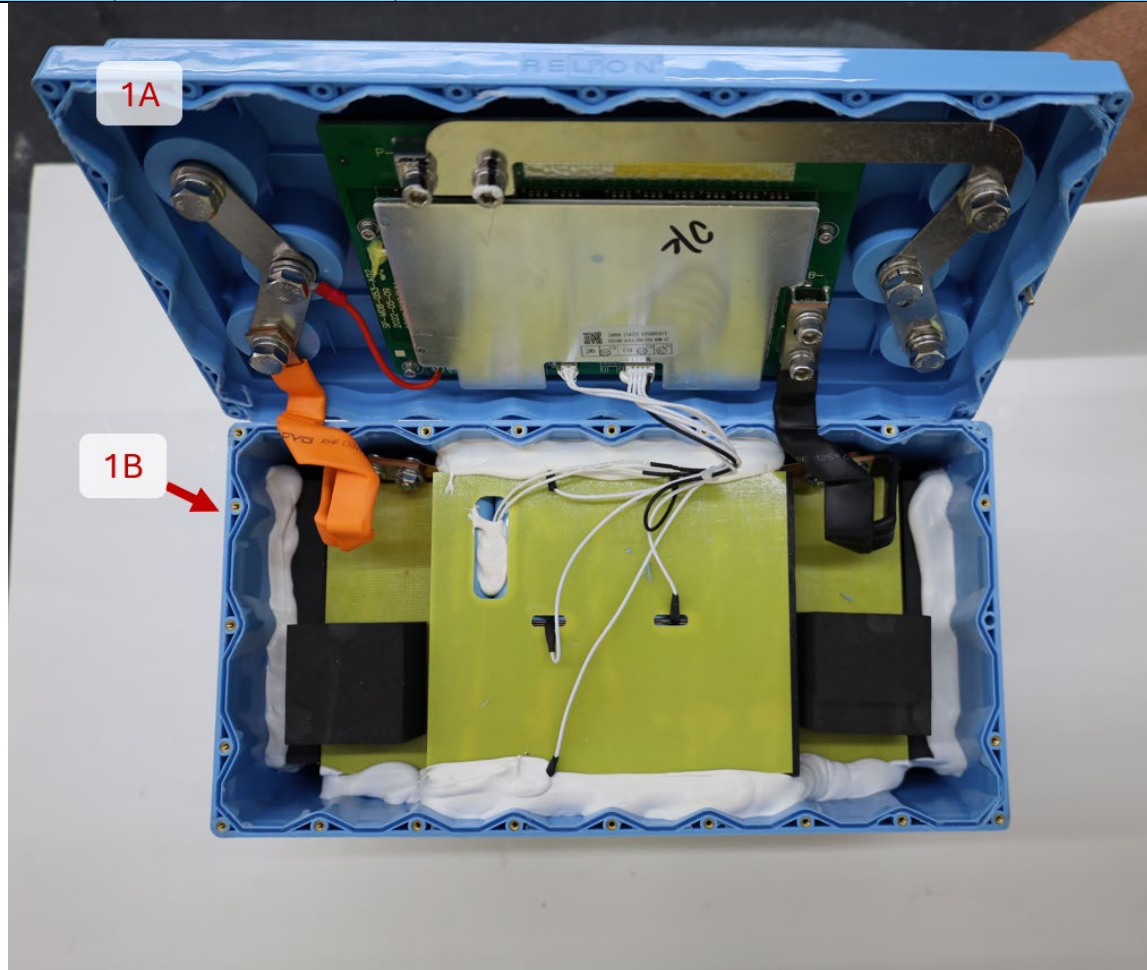
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https://ceb8596f236225acd007-8e95328c173a04ed694af83ee4e24c15.ssl.cf5.rackcdn.com/user/Legacy-Series-User-Manual_122121.pdf (annotated).

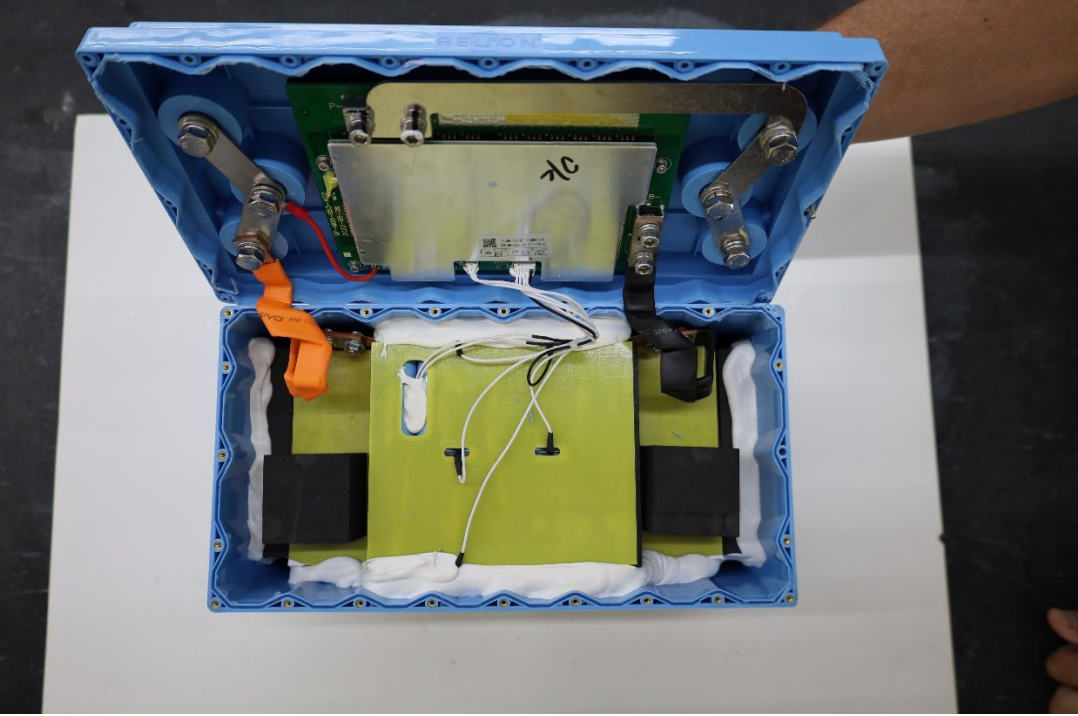


US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	
[1a] a battery pack housing;	The RELiON RB100-HP includes a battery pack housing (e.g., 1A-1B).

US9,954,207 Claim Element

Relion (RELiON RB100-HP)



US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	
<p>[1b] at least one lithium-based rechargeable cell within said housing; and</p>	<p>The RELiON RB100-HP includes at least one lithium-based rechargeable cell (e.g., 7) within the housing.</p>

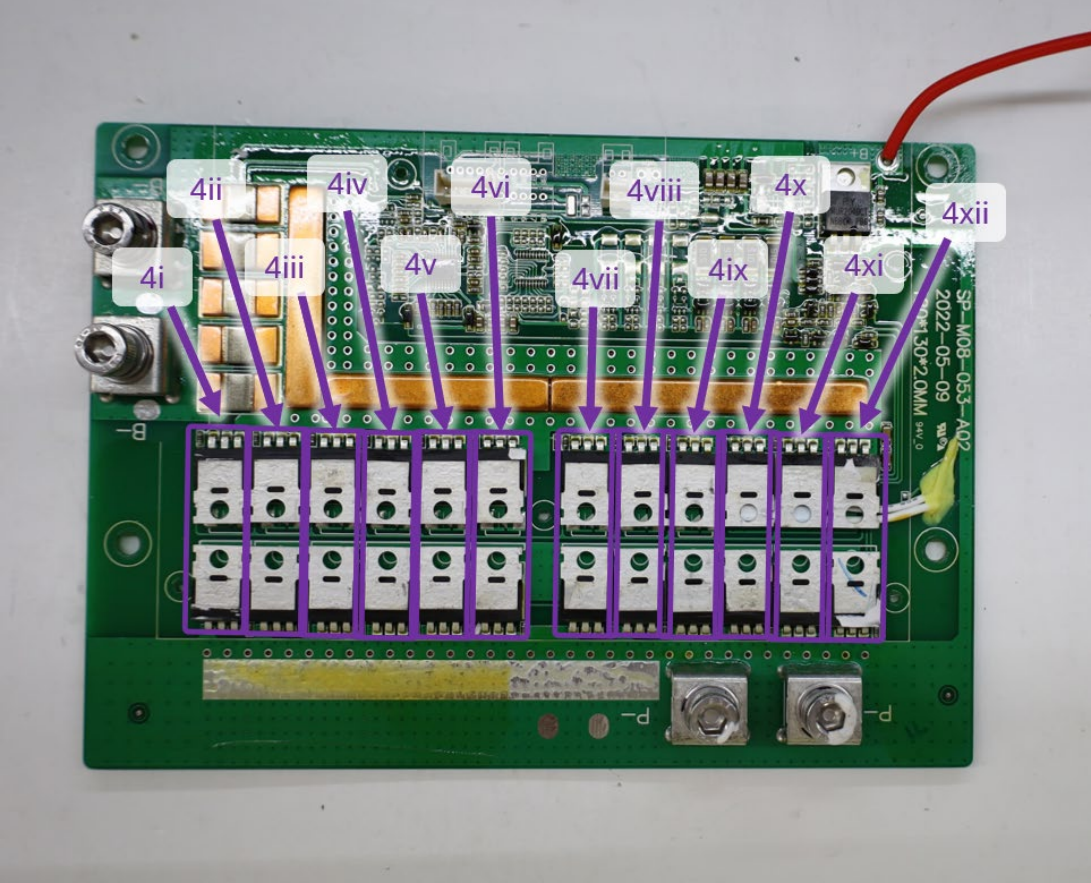
US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	  
[1c-i]	The RELiON RB100-HP includes a solid state switching apparatus.

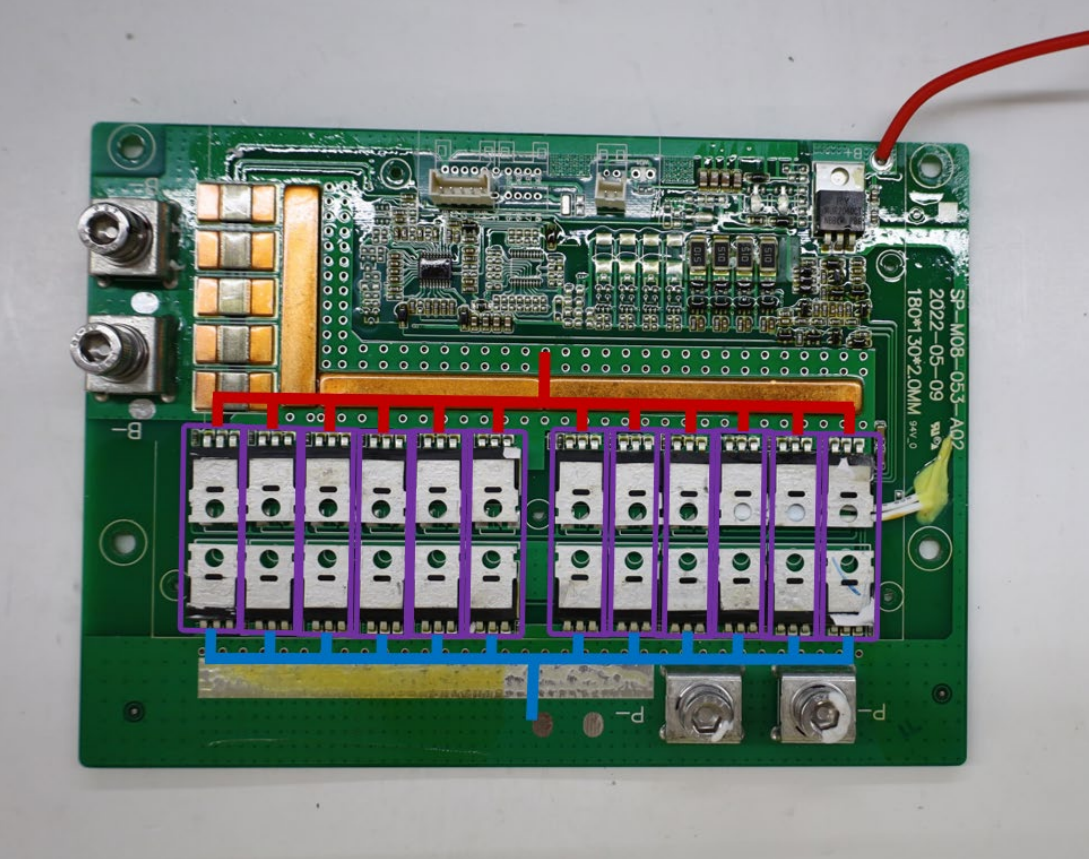
US9,954,207 Claim Element

a solid state switching apparatus comprising a plurality of pairs of solid state switches with one pair of solid state switches connected in a parallel configuration to another pair of solid state switches,

Relion (RELiON RB100-HP)

The solid state switches of the RELiON RB100-HP include a plurality of pairs of solid state switches with one pair of solid state switches connected in a parallel configuration to another pair of solid state switches (e.g., 4i-4xii).

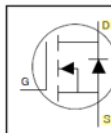
US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	

US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	
<p>[1c-ii] each switch having a source and a drain, the switches of a pair of solid state switches being configured such that either the drains of the switches are connected or the sources of the switches are connected, and</p>	<p>Each switch of the RELiON RB100-HP has a source (i.e., “S”) and a drain (i.e., “D”).</p>

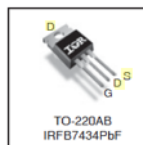
Strong $IRFET^{\text{TM}}$

IRFB7434PbF

- Brushed Motor drive applications
- BLDC Motor drive applications
- Battery powered circuits
- Half-bridge and full-bridge topologies
- Synchronous rectifier applications
- Resonant mode power supplies
- OR-ing and redundant power switches
- DC/DC and AC/DC converters
- DC/AC Inverters



V _{DSS}	40V
R _{DS(on)} typ.	1.25mΩ
max.	1.6mΩ
I _D (Silicon Limited)	317A①
I _D (Package Limited)	195A



G	D	S
Gate	Drain	Source

Base part number	Package Type	Standard Pack		Complete Part Number
		Form	Quantity	
IRFB7434PbF	TO-220	Tube	50	IRFB7434PbF

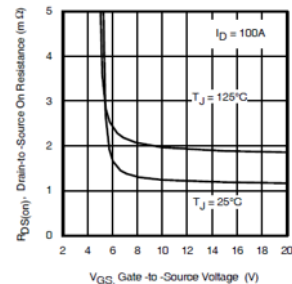


Fig 1. Typical On-Resistance vs. Gate Voltage
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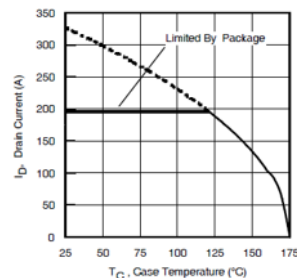
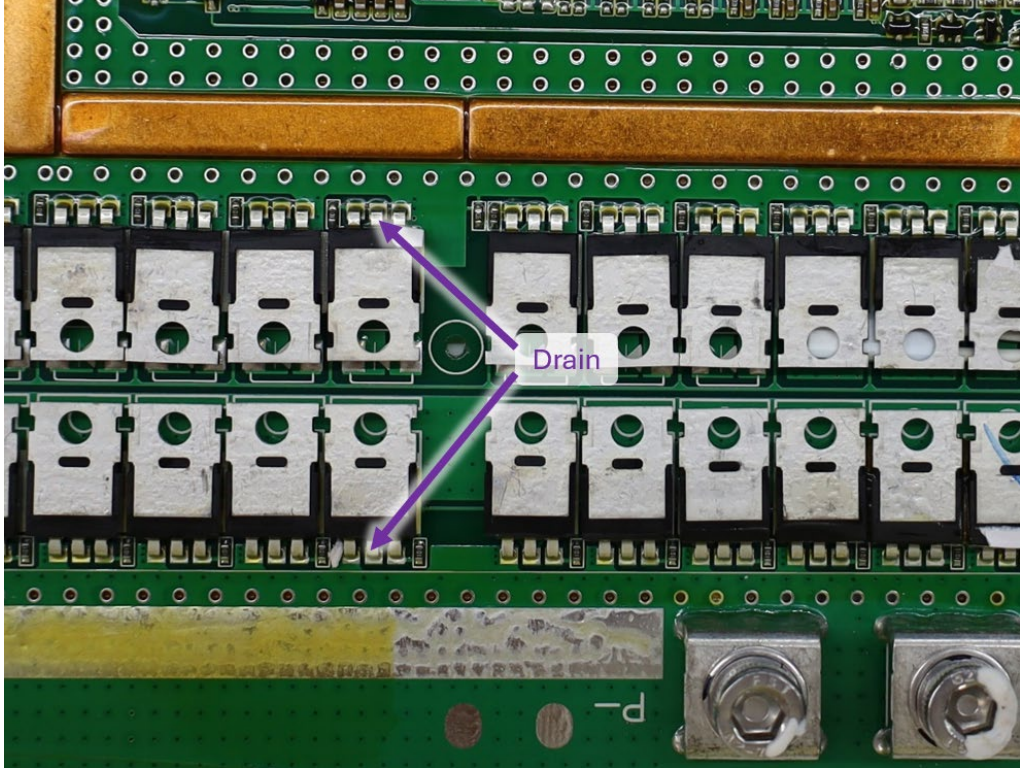
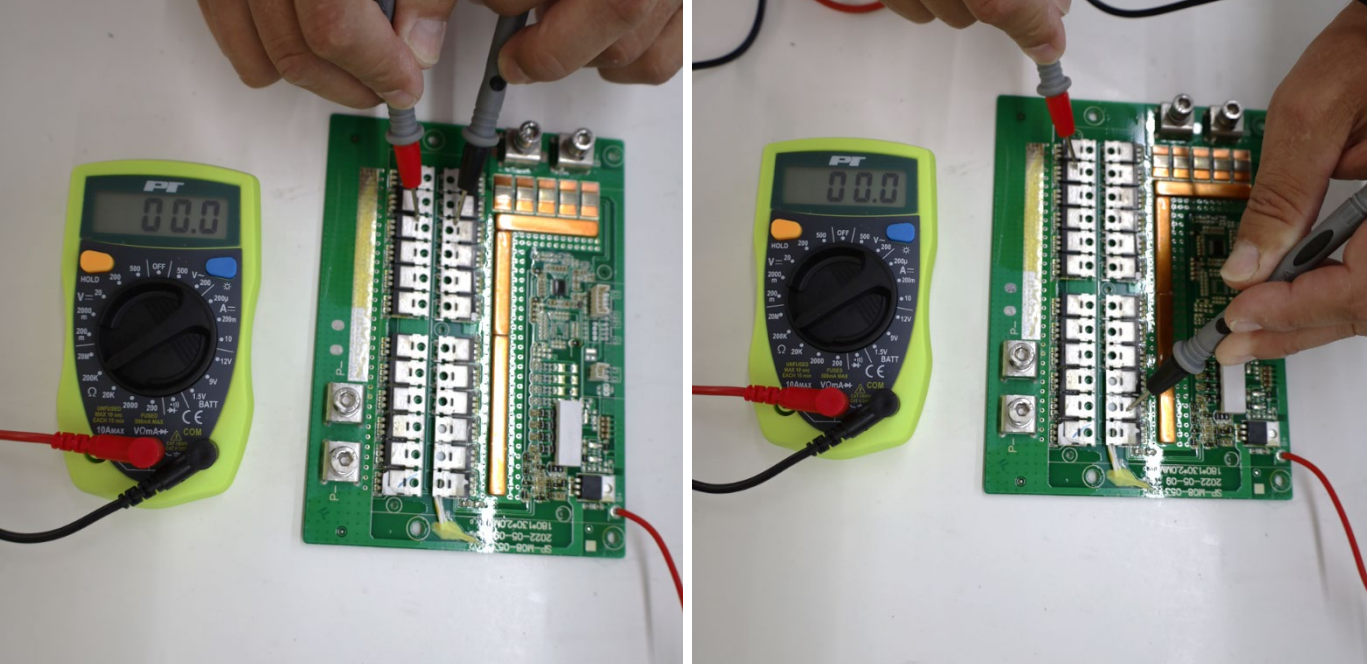


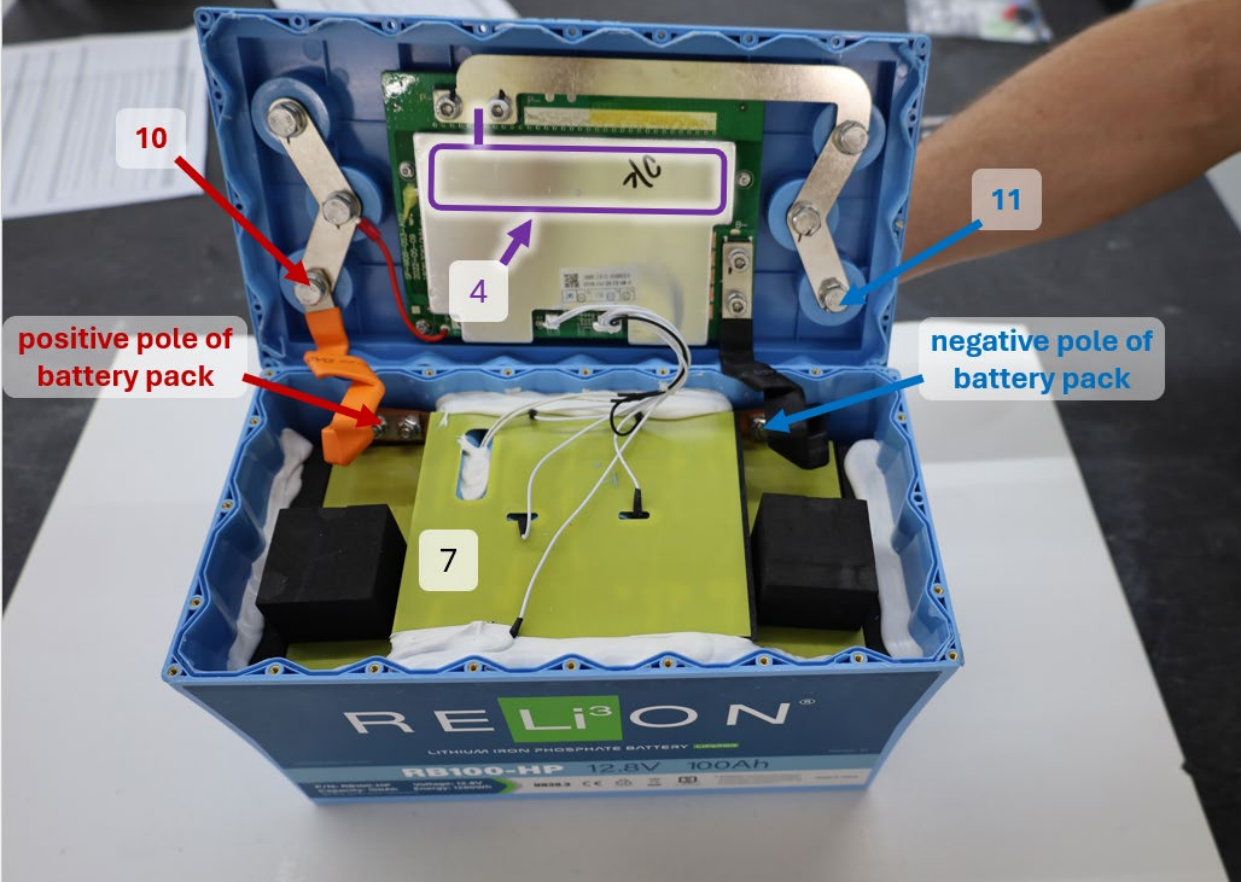
Fig 2. Maximum Drain Current vs. Case Temperature

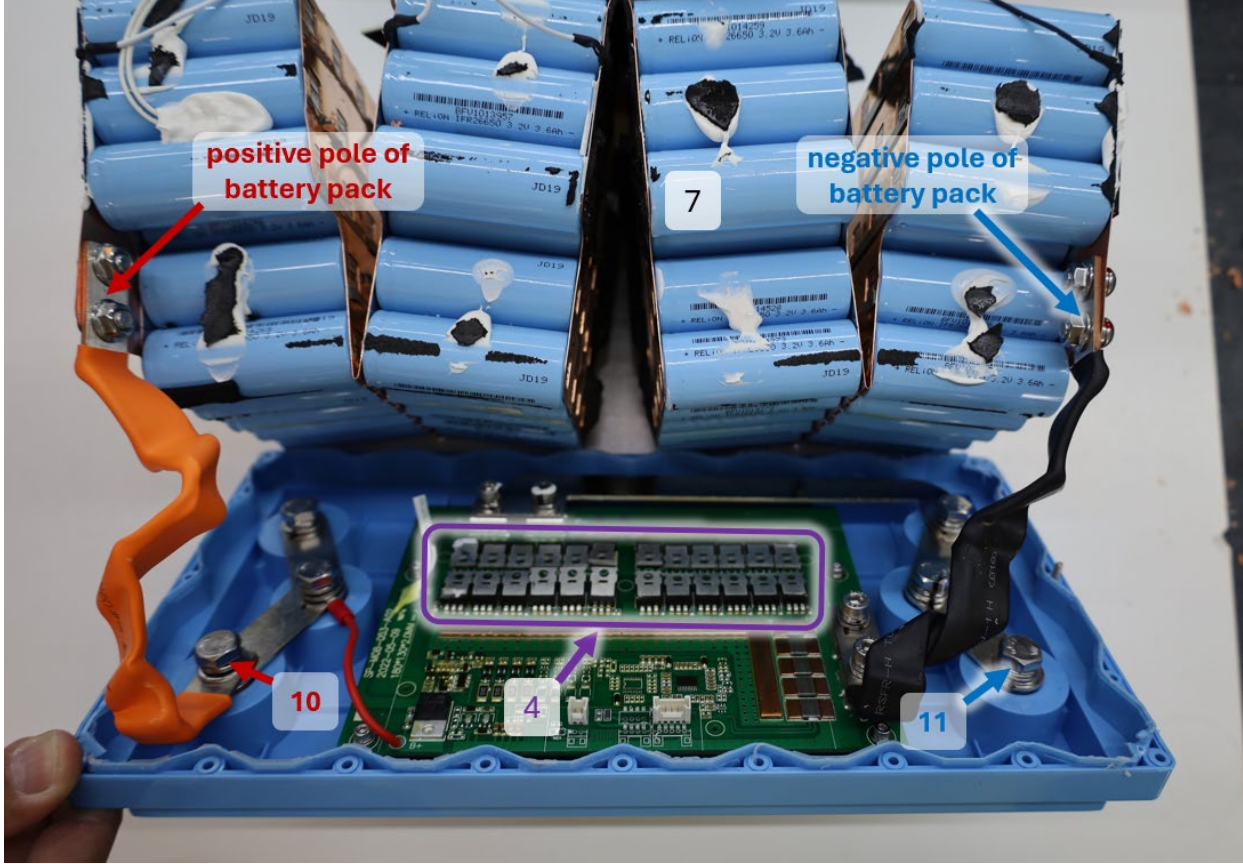
<http://www.irf.ru/pdf/irfb7434pbf.pdf> (annotated).

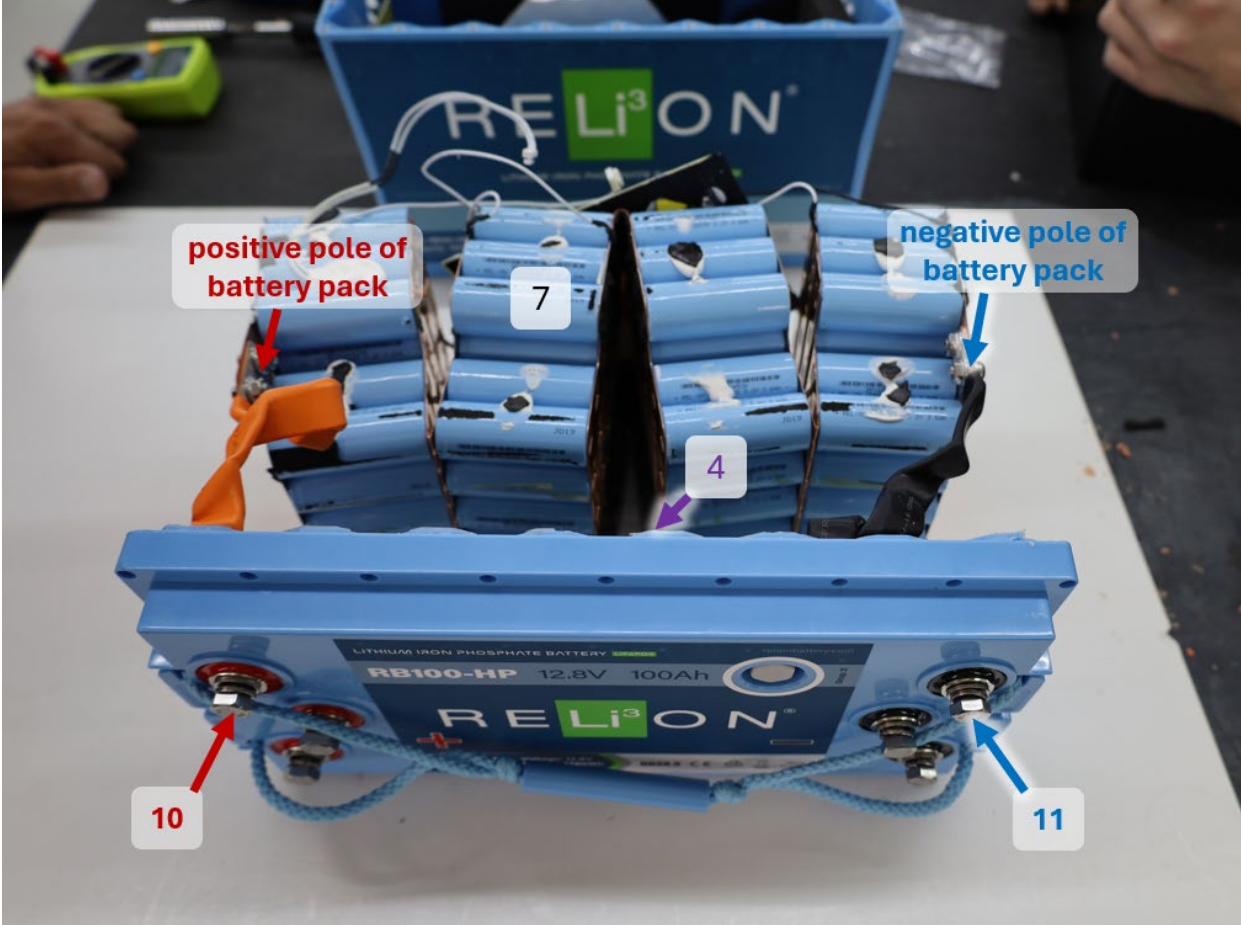
The switches of a pair of solid state switches of the RELiON RB100-HP are configured such that the drains of the switches are connected.

US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	<div></div> <p>For example, as demonstrated by testing the electrical continuity using a multimeter, the drains of the switches of the RELiON RB100-HP are connected, as shown by the nominal resistance measured between the drains of opposed MOSFETs.</p>

US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	
<p>[1c-iii] said parallel configuration being connected with one or more cells between the positive and negative terminals,</p>	<p>The parallel configuration of solid state switches (4) of the RELiON RB100-HP are connected with one or more cells (7) between the positive (10) and negative terminals (11).</p>


US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	 <p>The photograph shows the internal components of a Relion RB100-HP battery pack. The pack is housed in a blue plastic casing. Inside, there is a green printed circuit board (PCB) with various electronic components. A large, rectangular, light-colored battery cell is visible, labeled with the number 4. The positive terminal is labeled 10 and is connected to a red wire. The negative terminal is labeled 11 and is connected to a blue wire. A black component, labeled 7, is also visible. The bottom of the casing features the Relion logo and the text "RELiON LITHIUM IRON PHOSPHATE BATTERY RB100-HP 12.8V 100Ah".</p> <p>10</p> <p>positive pole of battery pack</p> <p>4</p> <p>11</p> <p>negative pole of battery pack</p> <p>7</p> <p>RELiON[®] LITHIUM IRON PHOSPHATE BATTERY RB100-HP 12.8V 100Ah</p>

US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	 <p>positive pole of battery pack</p> <p>negative pole of battery pack</p> <p>7</p> <p>10</p> <p>4</p> <p>11</p>

US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	
<p>[1d] wherein a total discharging amount of each lithium-based cell in the battery pack is from 3 Ah to 2000 Ah, and charging voltage per one cell is 2.0 to 4.2 V.</p>	<p>The total discharging amount of each lithium-based cell in the RELiON RB100-HP is from 3 Ah to 2000 Ah (e.g., 3.6Ah), and the charging voltage per one cell is from 2.0 to 4.2 V (e.g., 3.2V).</p>

US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	
Claim 12	
<p>[12p]</p> <p>A deep cycle battery having positive and negative terminals in a 6 volt to 800 volt operating system, comprising:</p>	<p>To the extent the preamble is limiting, the RELiON RB100-HP is a deep cycle battery having positive (10) and negative terminals (11) in a 6 volt to 800 volt operating system.</p>

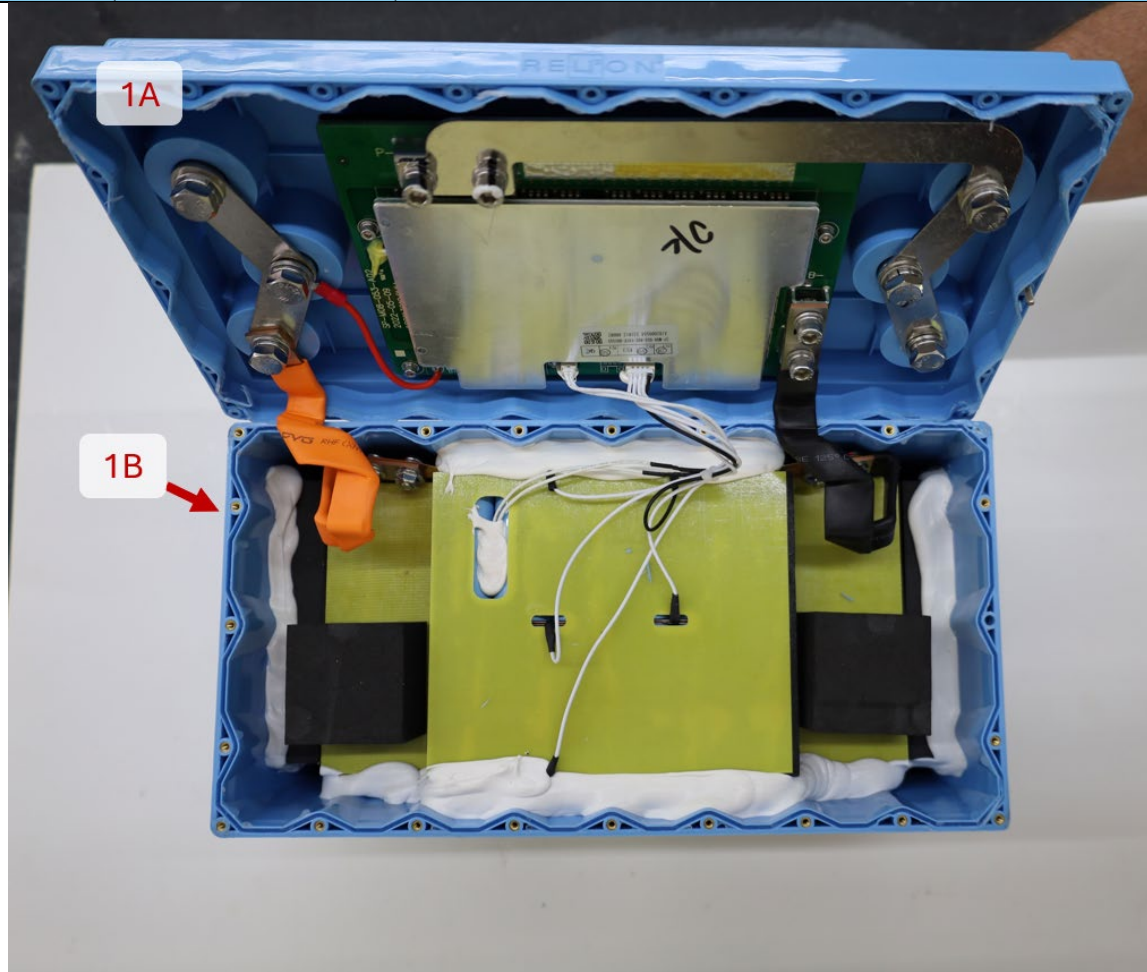
US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	  

US9,954,207 Claim Element	Relion (RELiON RB100-HP)																																								
	<div><div></div><div><h4>4.5. Battery Orientation</h4><ul style="list-style-type: none">Lithium batteries can be placed upright or on their sides.Do not install batteries in a zero-clearance compartment, overheating may result. Always leave at least 4" of space around all sides and top of battery.Keep any flammable/combustible material (e.g., paper, cloth, plastic, etc.) that may be ignited by heat, sparks, or flames at a minimum distance of two feet away from the batteries.Battery compartment and any material within two feet should be noncombustible.<h4>4.6. Series or Parallel Connections</h4><p>When connecting batteries in series or parallel, please follow these guidelines:</p><p>(1) Make sure each battery is within 50mV (0.05V) of each other before putting them in service. This will minimize the chance of imbalance between batteries. If your batteries get out of balance, the voltage of any battery is >50mV (0.05V) from another battery in the set, you should charge each battery individually to rebalance.</p><p>(2) Size batteries in parallel accordingly: The capacity of batteries (rated in amp-hours) when connected in parallel is increased by the multiple of the batteries connected (2x, 3x, 4x, etc). However, the current ratings (discharge and charge) for parallel batteries is only increased by 75% of the multiple of the batteries connected (1.5x, 2.25x, 3x, etc).</p><p>(3) Batteries connected in series are best charged as individual batteries. charging as a series bank can lead to imbalances and reduced runtime, requiring an occasional individual balancing charge.</p><p>(4) Please reference RELiON's LiFePO4 Charging Instructions document (available on our website at reliombattery.com) for series and parallel charging.</p><table><tr><th colspan="5">Specifications for Batteries in Parallel</th></tr><tr><td>Battery Quantity</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>Voltage</td><td>12.8</td><td>12.8</td><td>12.8</td><td>12.8</td></tr><tr><td>Capacity (Ah)</td><td>100</td><td>200</td><td>300</td><td>400</td></tr><tr><td>Max Continuous Discharge Current</td><td>100</td><td>150</td><td>225</td><td>300</td></tr><tr><td>Peak Discharge Current</td><td>200</td><td>300</td><td>450</td><td>600</td></tr><tr><td>Rec'd Charge Current</td><td>50</td><td>75</td><td>113</td><td>150</td></tr><tr><td>Max Charge Current</td><td>100</td><td>150</td><td>225</td><td>300</td></tr></table><div>RELIONBATTERY.COM • 855-931-2466 9</div></div></div> <div>https://ceb8596f236225acd007-8e95328c173a04ed694af83ee4e24c15.ssl.cf5.rackcdn.com/user/Legacy-Series-User-Manual_122121.pdf (annotated).</div>	Specifications for Batteries in Parallel					Battery Quantity	1	2	3	4	Voltage	12.8	12.8	12.8	12.8	Capacity (Ah)	100	200	300	400	Max Continuous Discharge Current	100	150	225	300	Peak Discharge Current	200	300	450	600	Rec'd Charge Current	50	75	113	150	Max Charge Current	100	150	225	300
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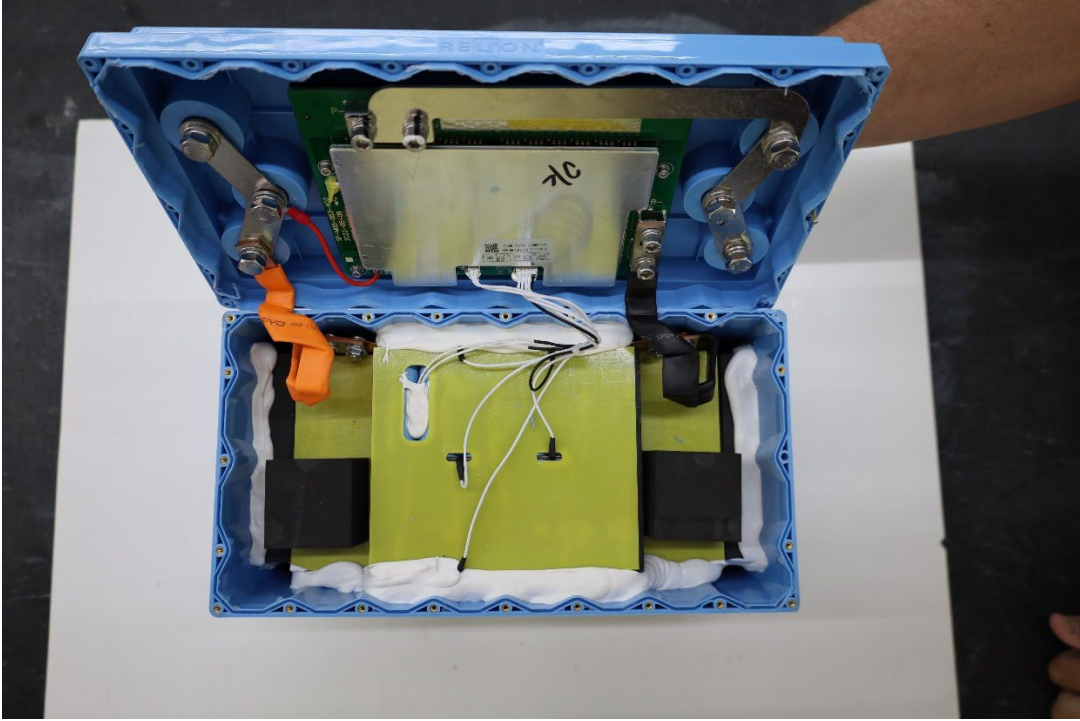


US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	
[12a] a battery pack housing;	The RELiON RB100-HP includes a battery pack housing.

US9,954,207 Claim Element

Relion (RELiON RB100-HP)

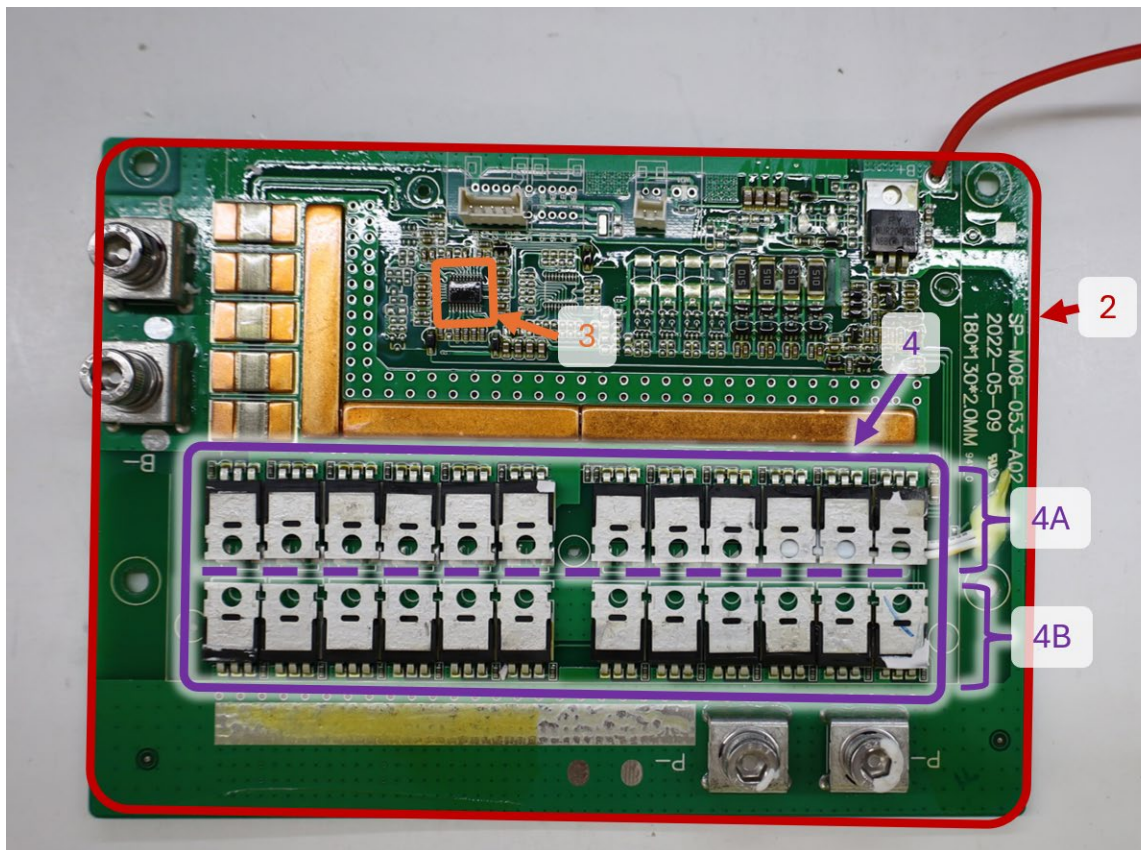


US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	
<p>[12b] at least one lithium-based rechargeable cell within said housing;</p>	<p>The RELiON RB100-HP includes at least one lithium-based rechargeable cell (e.g., 7) within said housing.</p>

US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	  
[12c]	The RELiON RB100-HP includes a battery management system including a processor (3) and a circuit board (2).

US9,954,207 Claim Element


a battery management system including a processor and a circuit board which protects from one of overvoltage, undervoltage, reverse polarity, short circuit, and extremes of temperature;

Relion (RELiON RB100-HP)

The RELiON RB100-HP protects from one of overvoltage, undervoltage, reverse polarity, short circuit, and extremes of temperature. For example, the RELiON RB100-HP includes thermal protection sensors (6) to protect against operation during extreme temperature conditions.

US9,954,207 Claim Element

Relion (RELiON RB100-HP)



RELiON® | DATA SHEET

RB100-HP

Voltage: 12.8V | Capacity: 100 Ah | Energy: 1280 Wh | Group: 31

LITHIUM IRON PHOSPHATE BATTERY **LiFePO₄**

ELECTRICAL SPECIFICATIONS

Nominal Voltage	12.8 V
Nominal Capacity	100 Ah
Reserve Capacity @ 25 A	240 min
Resistance	≤30 mΩ @ 50% SOC
Efficiency	99%
Self Discharge	<3% per Month
Series Connections	No. 12V systems only.
Parallel Connections	No. 1 battery only.

DISCHARGE SPECIFICATIONS

Maximum Continuous Discharge Current	100 A
Maximum Discharge Current	800 Amps
Lithium Marine Cranking Amp (MCA) @ 20°F (-6.7°C)	Up to 800 Amps for 8 seconds
Discharge Over-Current Protection	1000 A ±100 A (2.2 ±1 ms)
Recommended Low Voltage Disconnect	11.0 V
Discharge Under-Voltage Protection	9.2 V (2.3 ±0.08 vpc) (4.2 ±0.5 s)
Reconnect Voltage	10.0 V (2.5 ±0.1 vpc)
Short Circuit Protection Response Time	200-600 μs

TEMPERATURE SPECIFICATIONS

Discharge Temperature	-4 to 140°F (-20 to 60°C)
Charge Temperature*	32 to 130°F (0 to 55°C)
Recommended Storage Temperature	23 to 95°F (-5 to 35°C)
BMS High Temperature Cut-Off	176 °F (80°C)
Reconnect Temperature	122 °F (50°C)

*Refer to charge currents below 32°F (0°C)

MECHANICAL SPECIFICATIONS

Dimensions (L x W x H)	13 x 6.8 x 8.4"
	329 x 172 x 214.7 mm
Weight	29.8 lbs (13.5 kg)
Terminal Type	M8 x 1.25 x 12mm
Terminal Torque	80 - 100 in-lbs (9 - 11 N-m)
Case Material	ABS & PC blend (UL94-V0 flame rating)
Enclosure Protection	IP67
Cell Type - Chemistry	Cylindrical - LiFePO ₄

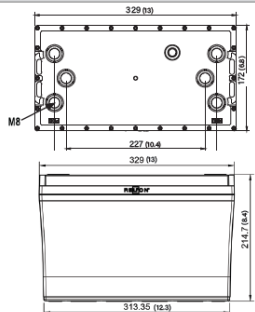
CHARGE SPECIFICATIONS

Maximum Continuous Charge Current	5 A - 50 A
Maximum Battery Charger Output	100 Amps
Peak Charge Acceptance	165 Amps for up to 1 minute
Maximum Engine Alternator Size	150 Amps
Maximum Charge Current 14°F to 32°F (-10°C to 0°C)	<0.1 C (10 Amps)
Maximum Charge Current -4 to 14°F (-20 to -10°C)	<0.05 C (5 Amps)
Recommended Charge Voltage	14.4 - 14.8 V
BMS Charge Voltage Cut-Off	15.4 V (3.85 ±0.025 vpc) (1 ±0.2 s)
Reconnect Voltage	14.6 V (3.65 ±0.05 vpc)
Balancing Voltage	14.4 V (3.6 ±0.025 vpc)

COMPLIANCE SPECIFICATIONS

Certifications	UN 38.3, CE & UKCA (battery) UL1642 (cells) (File# MH62098) IEC62133 (cells)
Shipping Classification	UN 3480, CLASS 9

DIMENSIONAL SPECIFICATIONS



reliionbattery.com

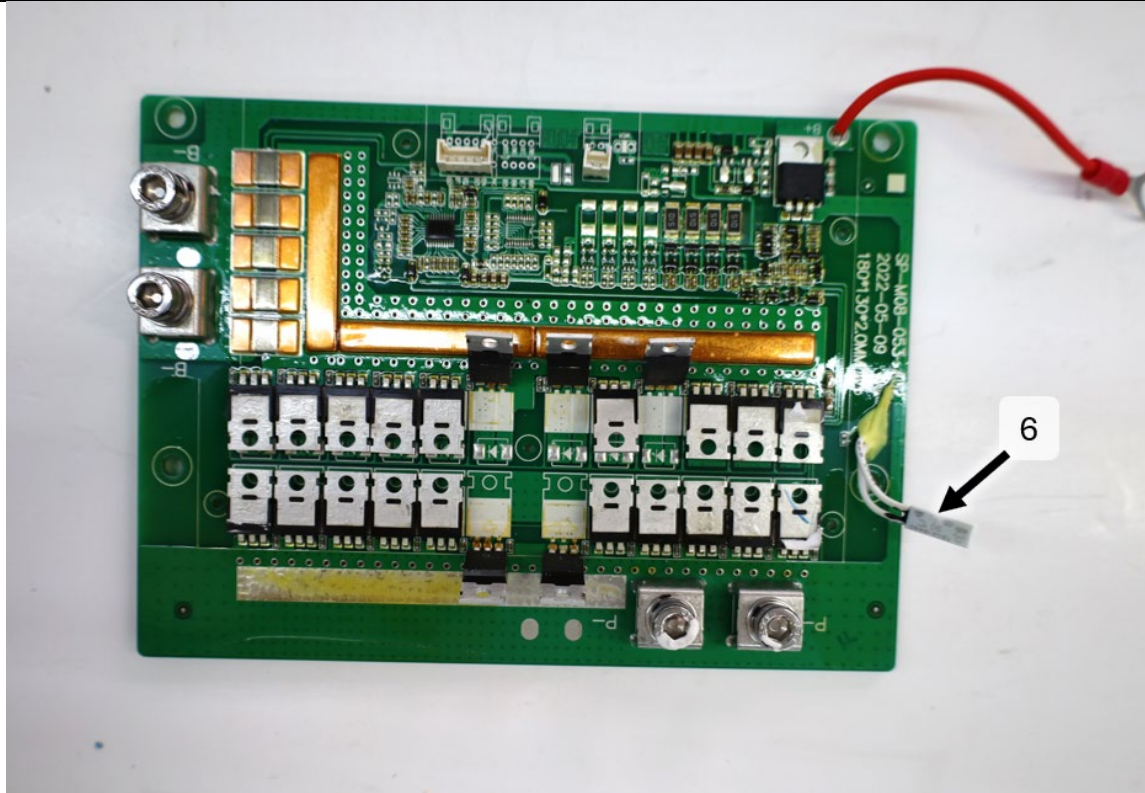
+1.803.547.7288 - TOLL FREE: (855) 931-2466 | N85W12545 Westbrook Crossing - Menomonee Falls, Wisconsin 53051, USA
 +31 (0) 20 34 34 22 100 | Snijdersbergweg 93 1105 AN - Amsterdam, The Netherlands
 +64 9 415 72 61 | 40-42 Apollo Drive - Albany, Auckland 0632, New Zealand

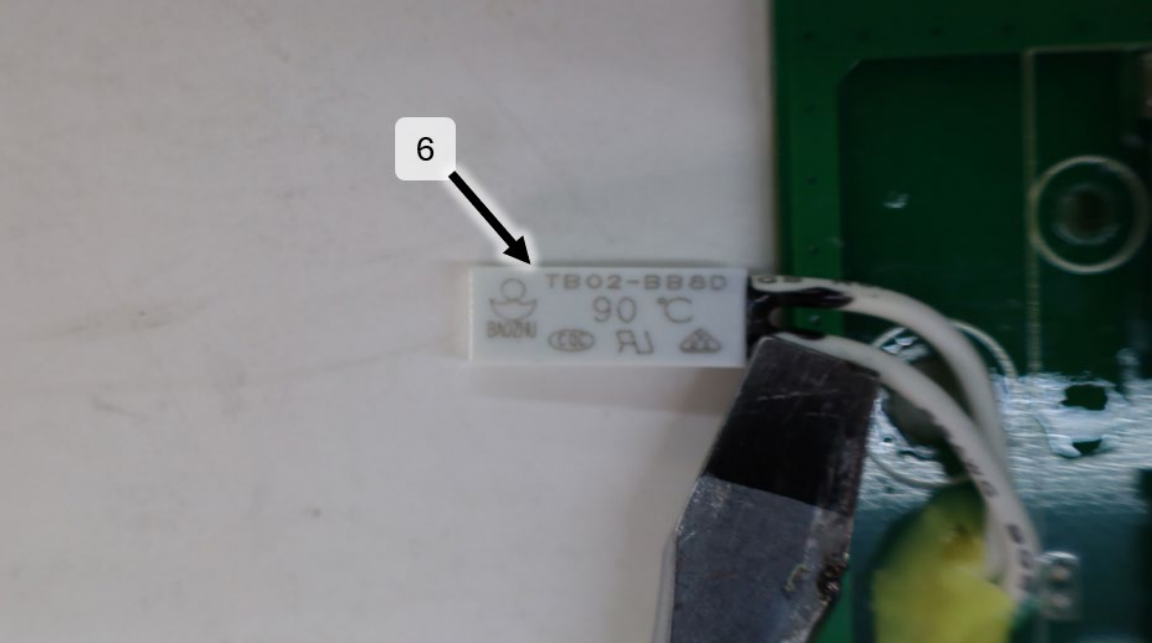


RB100-HP DATA SHEET - 061824

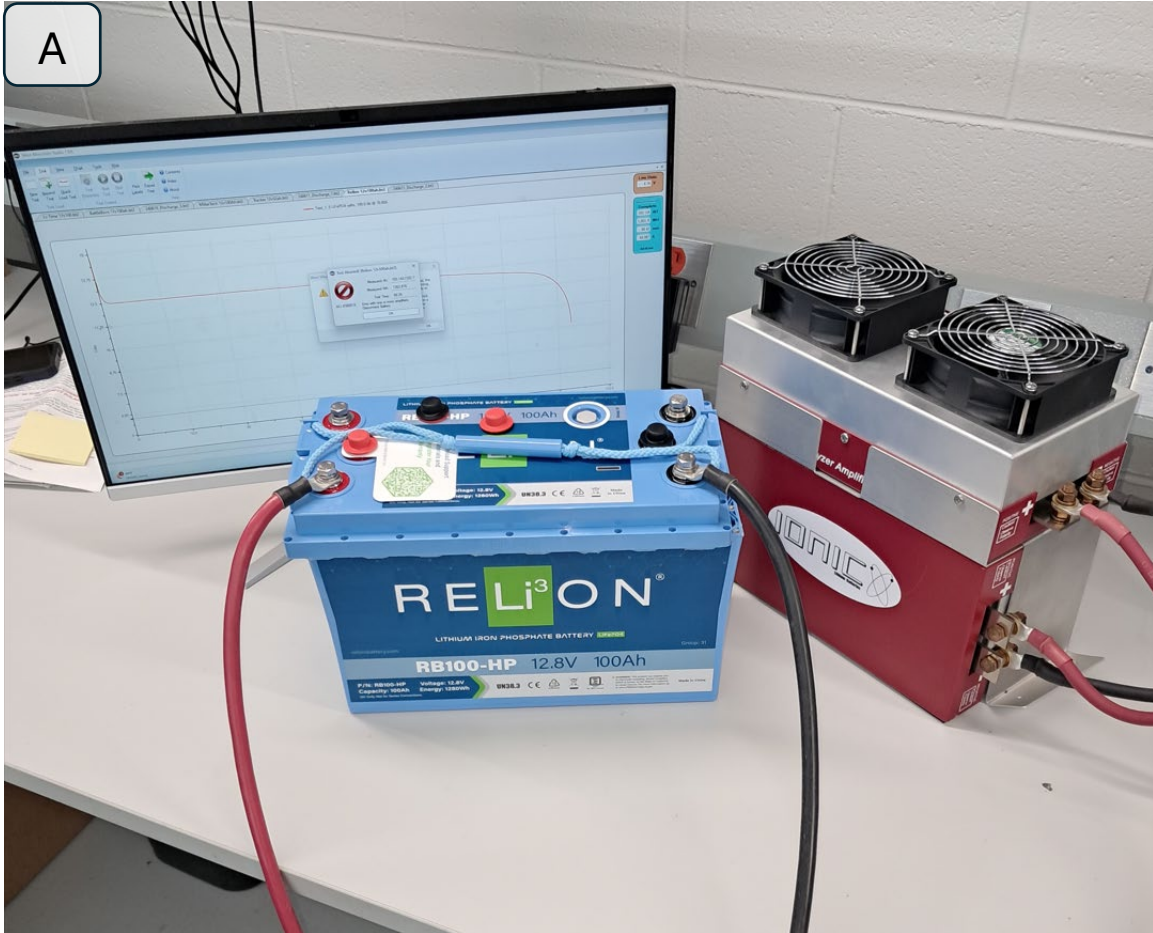
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US9,954,207 Claim Element

Relion (RELiON RB100-HP)

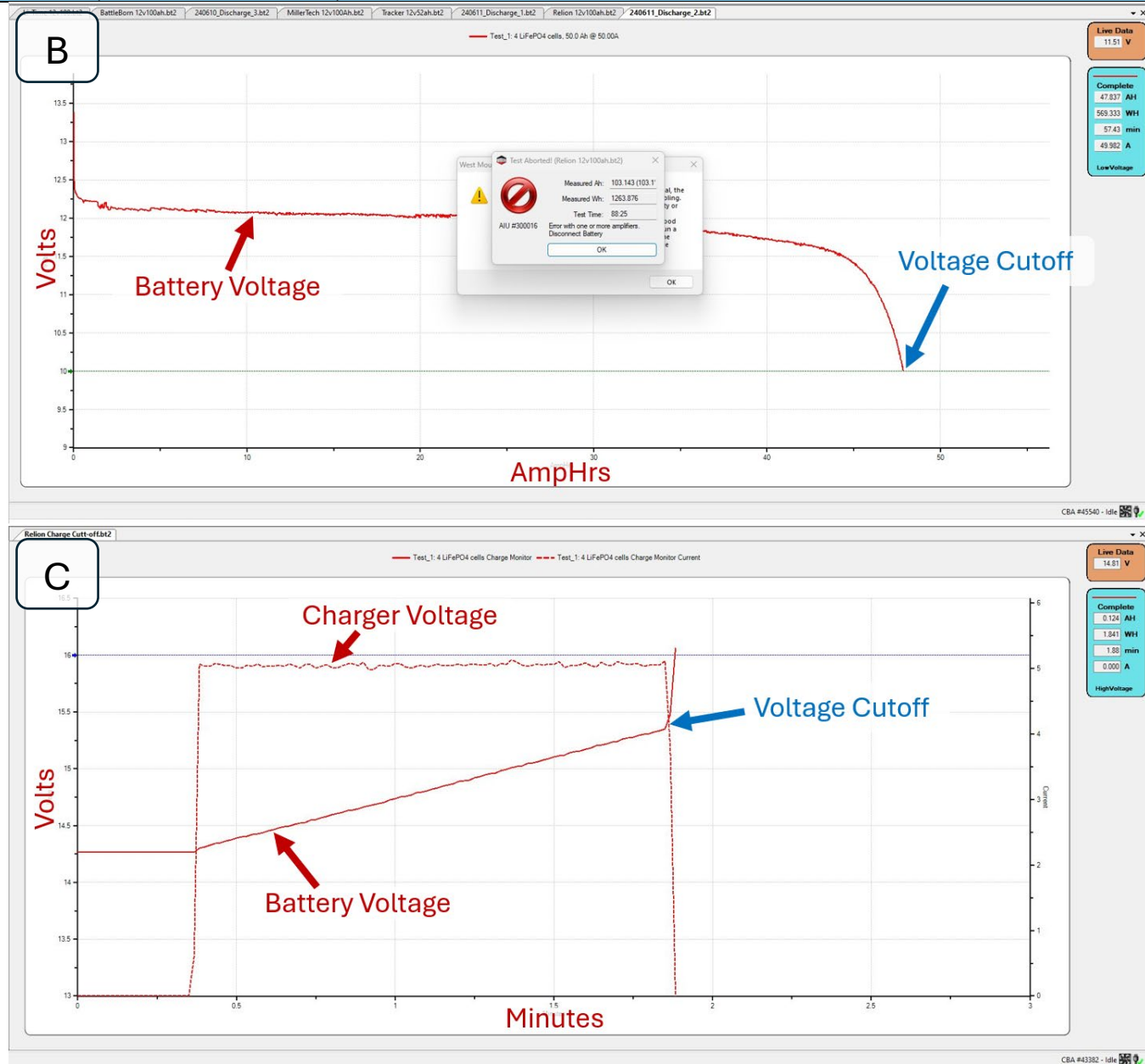


US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	<div>  </div> <div>  <p>BAOZHU ELECTRIC APPLIANCE 宝珠电器</p>  <p>Technical Specification Of TB02 Thermal Protector</p> </div> <p>Baozhu-TB02-BB8D Datasheet.pdf (annotated).</p> <p>Also, for example, as demonstrated by connecting the battery terminals of the RELiON RB100-HP to a computerized battery analyzer (<i>see</i> photo A below), the protection circuitry is demonstrated for an undervoltage condition by the termination of electrical current when the RELiON RB100-HP was discharged below its rated</p>

US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	<p>voltage (<i>see</i> photo B below). Similarly, the protection circuitry is demonstrated for an overvoltage condition by the termination of electrical current when the RELiON RB100-HP was charged above its rated voltage (<i>see</i> photo C below).</p> <div><div>A</div></div>


US9,954,207 Claim Element

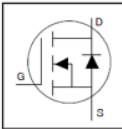
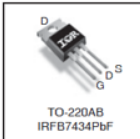
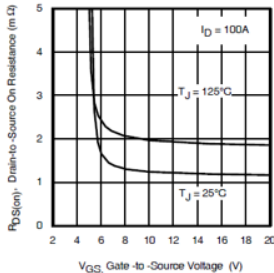
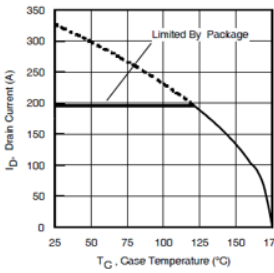
Relion (RELiON RB100-HP)



[12d-i]

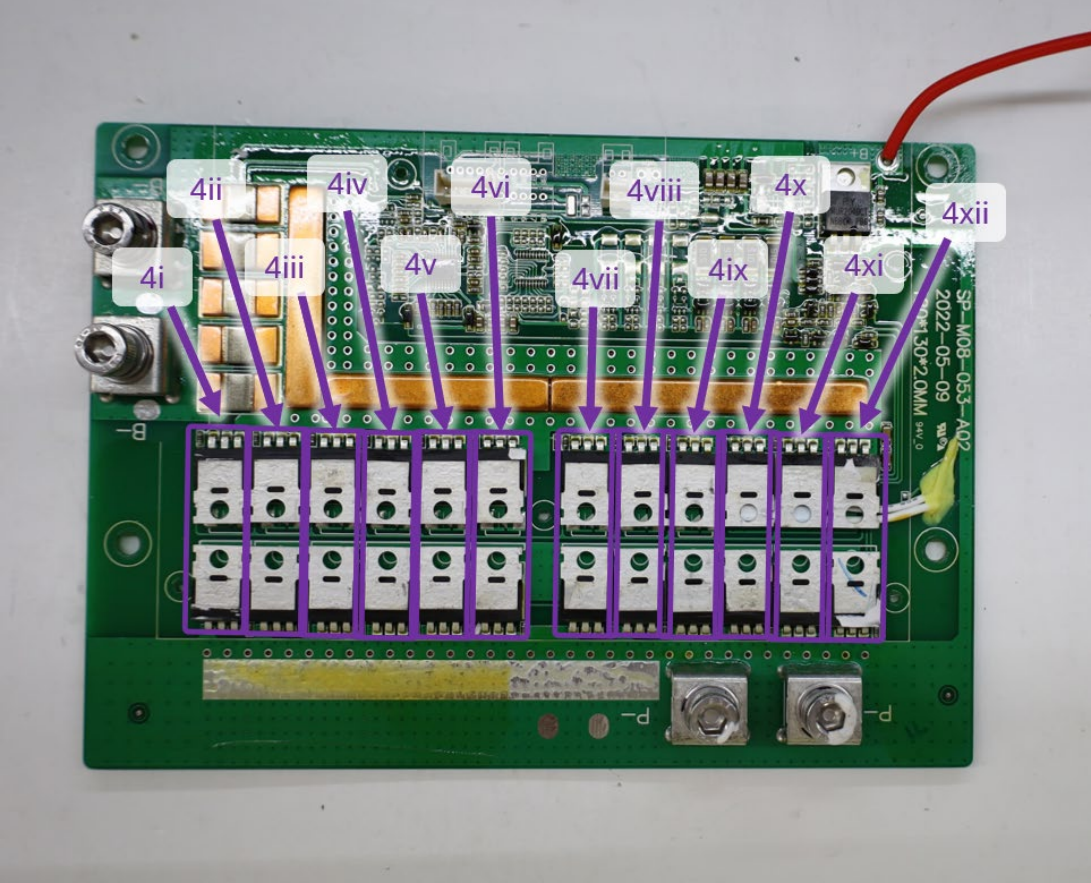
The RELiON RB100-HP includes a solid state switching apparatus.

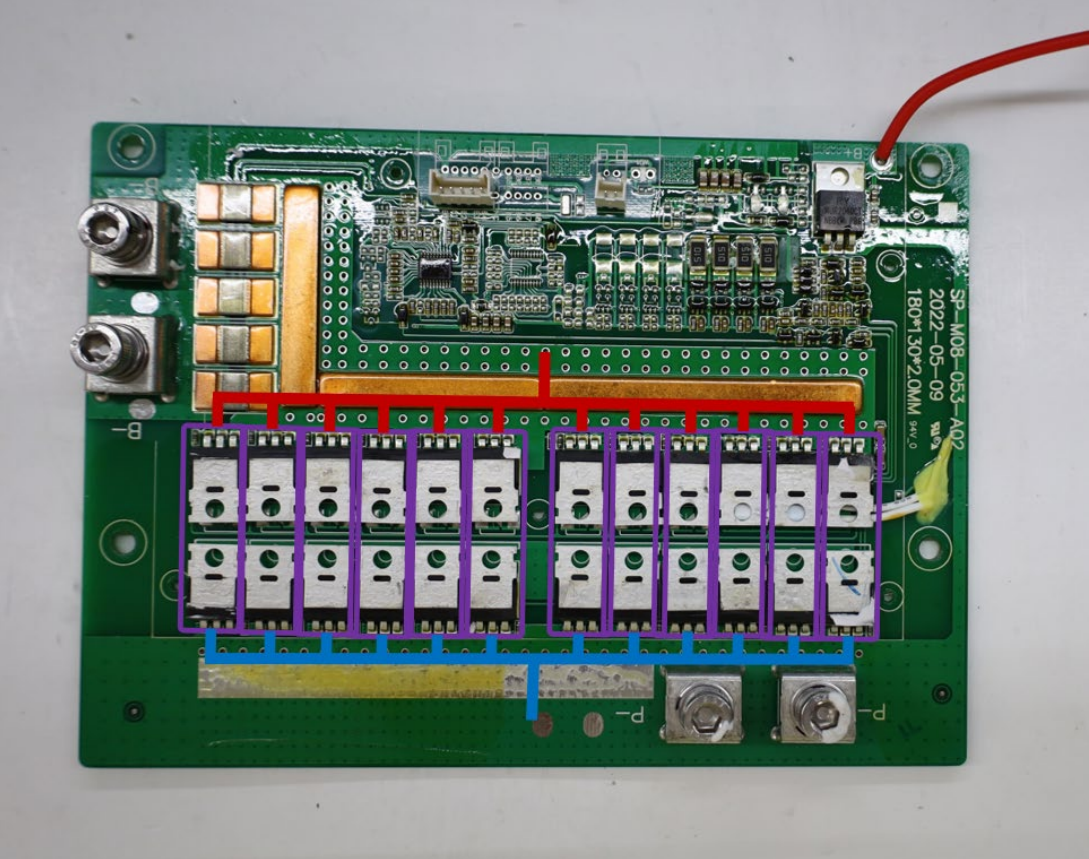
US9,954,207 Claim Element	Relion (RELiON RB100-HP)
<p>wherein said circuit board comprises a solid state switching apparatus comprising a plurality of pairs of solid state switches with one pair of solid state switches connected in a parallel configuration to another pair of solid state switches,</p>	

US9,954,207 Claim Element	Relion (RELiON RB100-HP)																												
	<div><div><div><div><div>International IOR Rectifier</div><div>PD - 96436</div><div>StrongIRFET™</div><div>IRFB7434PbF</div><div>HEXFET® Power MOSFET</div></div><div><div><div><div><div>D</div><div>G</div><div>S</div></div><div></div></div><div><table><tr><td>V_{DS}</td><td>40V</td></tr><tr><td>R_{DS(on)} typ.</td><td>1.25mΩ</td></tr><tr><td>max.</td><td>1.6mΩ</td></tr><tr><td>I_D (Silicon Limited)</td><td>317AⓈ</td></tr><tr><td>I_D (Package Limited)</td><td>195A</td></tr></table></div><div><div></div><div>TO-220AB IRFB7434PbF</div></div><div><table><tr><td>G</td><td>D</td><td>S</td></tr><tr><td>Gate</td><td>Drain</td><td>Source</td></tr></table></div></div><div><div><div>Applications</div><ul style="list-style-type: none">• Brushed Motor drive applications• BLDC Motor drive applications• Battery powered circuits• Half-bridge and full-bridge topologies• Synchronous rectifier applications• Resonant mode power supplies• OR-ing and redundant power switches• DC/DC and AC/DC converters• DC/AC Inverters</div><div><div>Benefits</div><ul style="list-style-type: none">• Improved Gate, Avalanche and Dynamic dV/dt Ruggedness• Fully Characterized Capacitance and Avalanche SOA• Enhanced body diode dV/dt and dI/dt Capability• Lead-Free</div></div><div><div>Ordering Information</div><table><tr><th rowspan="2">Base part number</th><th rowspan="2">Package Type</th><th colspan="2">Standard Pack</th><th rowspan="2">Complete Part Number</th></tr><tr><th>Form</th><th>Quantity</th></tr><tr><td>IRFB7434PbF</td><td>TO-220</td><td>Tube</td><td>50</td><td>IRFB7434PbF</td></tr></table></div><div><div><div></div><div>Fig 1. Typical On-Resistance vs. Gate Voltage www.irf.com</div></div><div><div></div><div>Fig 2. Maximum Drain Current vs. Case Temperature 1 04/20/12</div></div></div></div></div></div></div>	V _{DS}	40V	R _{DS(on)} typ.	1.25mΩ	max.	1.6mΩ	I _D (Silicon Limited)	317AⓈ	I _D (Package Limited)	195A	G	D	S	Gate	Drain	Source	Base part number	Package Type	Standard Pack		Complete Part Number	Form	Quantity	IRFB7434PbF	TO-220	Tube	50	IRFB7434PbF
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IRFB7434PbF	TO-220	Tube	50	IRFB7434PbF																									

<http://www.irf.ru/pdf/irfb7434pbf.pdf> (annotated).

The RELiON RB100-HP comprises a plurality of pairs of solid state switches with one pair of solid state switches connected in a parallel configuration to another pair of solid state switches (e.g., 4i-4xii).

US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	

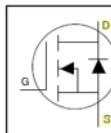
US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	
<p>[12d-ii] each switch having a source and a drain, the switches of a pair of solid state switches being configured such that either the drains of the switches are connected or the sources of the switches are connected, and</p>	<p>Each switch of the RELiON RB100-HP has a source (i.e., “S”) and a drain (i.e., “D”).</p>

Strong $IRFET^{\text{TM}}$

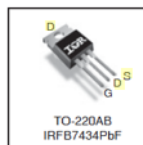
IRFB7434PbF

HEXFET® Power MOSFET

- Brushed Motor drive applications
- BLDC Motor drive applications
- Battery powered circuits
- Half-bridge and full-bridge topologies
- Synchronous rectifier applications
- Resonant mode power supplies
- OR-ing and redundant power switches
- DC/DC and AC/DC converters
- DC/AC Inverters



V _{DSS}	40V
R _{DS(on)} typ.	1.25mΩ
max.	1.6mΩ
I _D (Silicon Limited)	317A①
I _D (Package Limited)	195A



G	D	S
Gate	Drain	Source

Base part number	Package Type	Standard Pack		Complete Part Number
		Form	Quantity	
IRFB7434PbF	TO-220	Tube	50	IRFB7434PbF

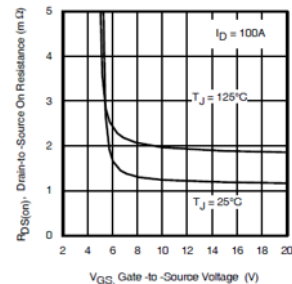


Fig 1. Typical On-Resistance vs. Gate Voltage
www.irf.com

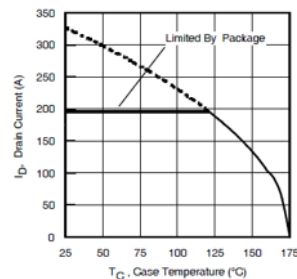
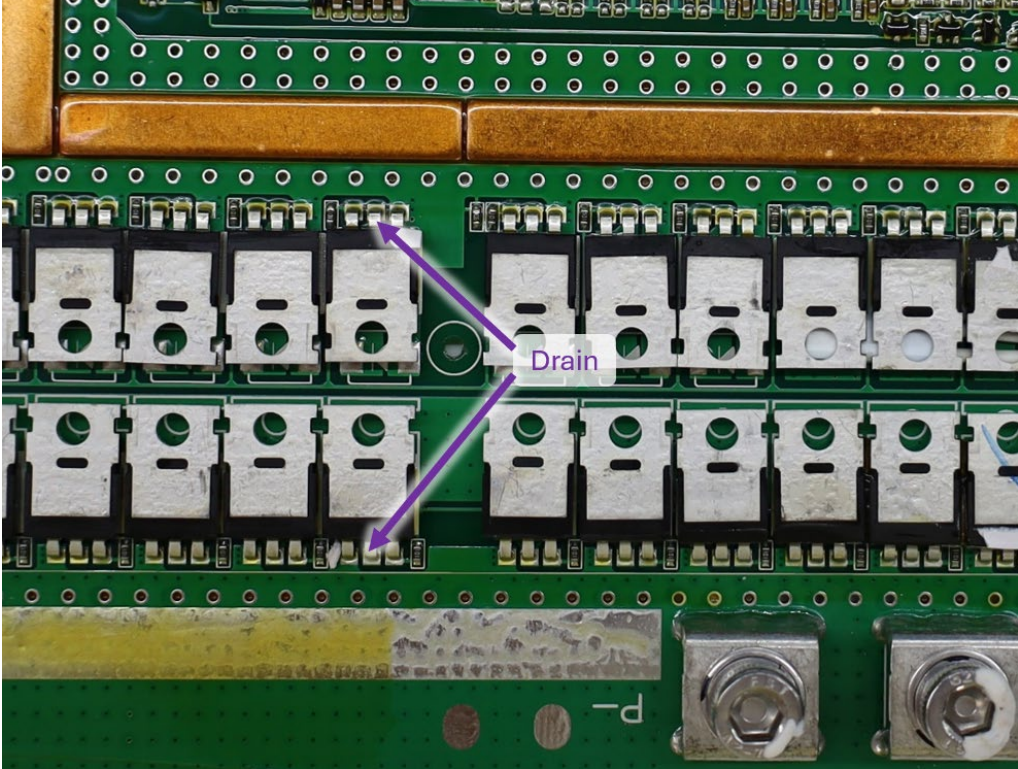
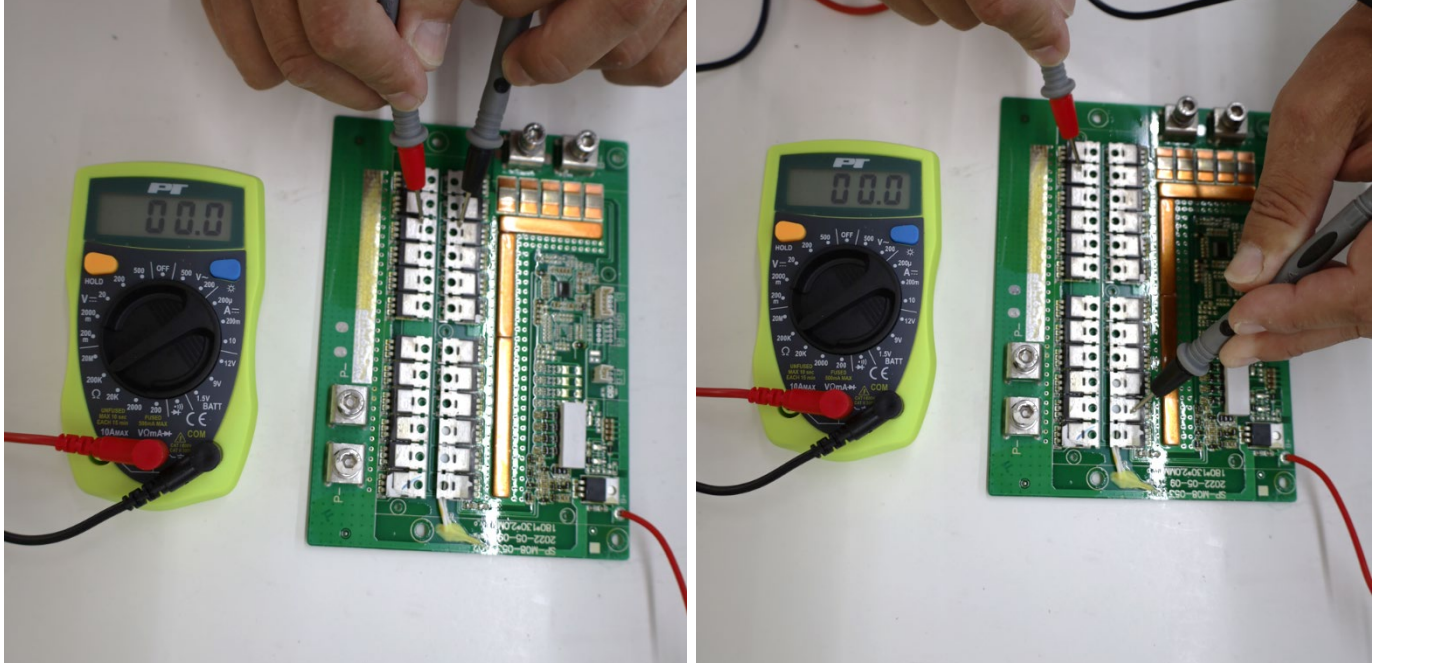


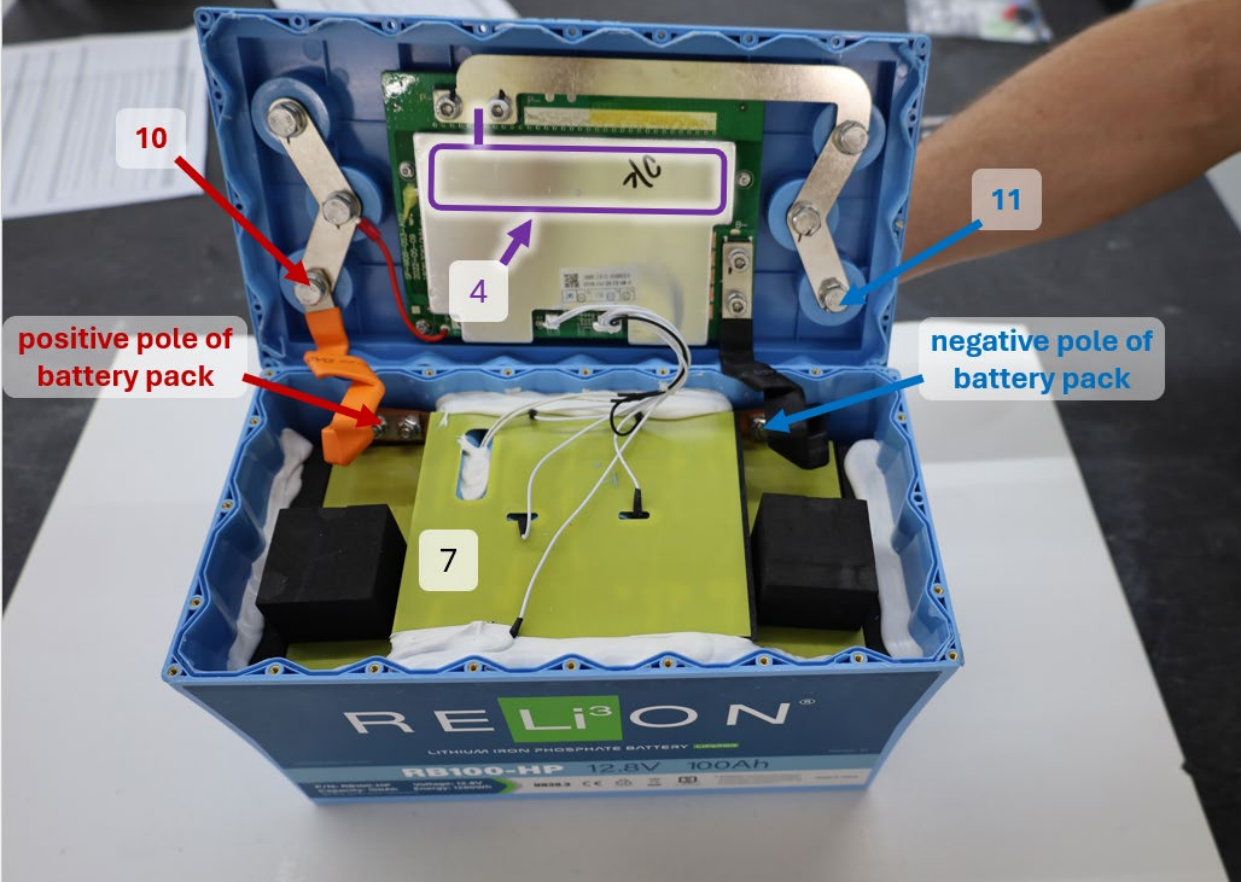
Fig 2. Maximum Drain Current vs. Case Temperature

<http://www.irf.ru/pdf/irfb7434pbf.pdf> (annotated).

The switches of a pair of solid state switches of the RELiON RB100-HP are configured such that the drains of the switches are connected.

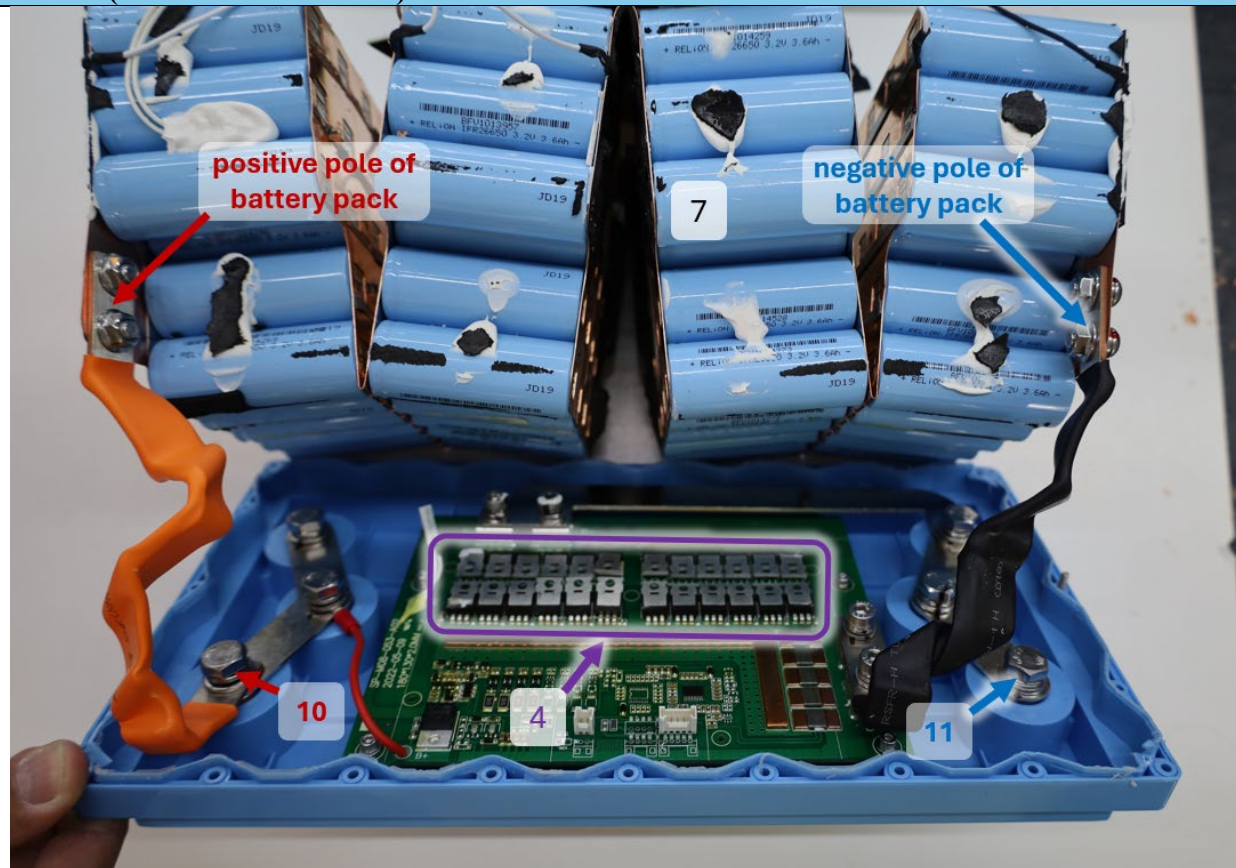
US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	<div></div> <p>For example, as demonstrated by testing the electrical continuity using a multimeter, the drains of the switches of the RELiON RB100-HP are connected, as shown by the nominal resistance measured between the drains of opposed MOSFETs.</p>

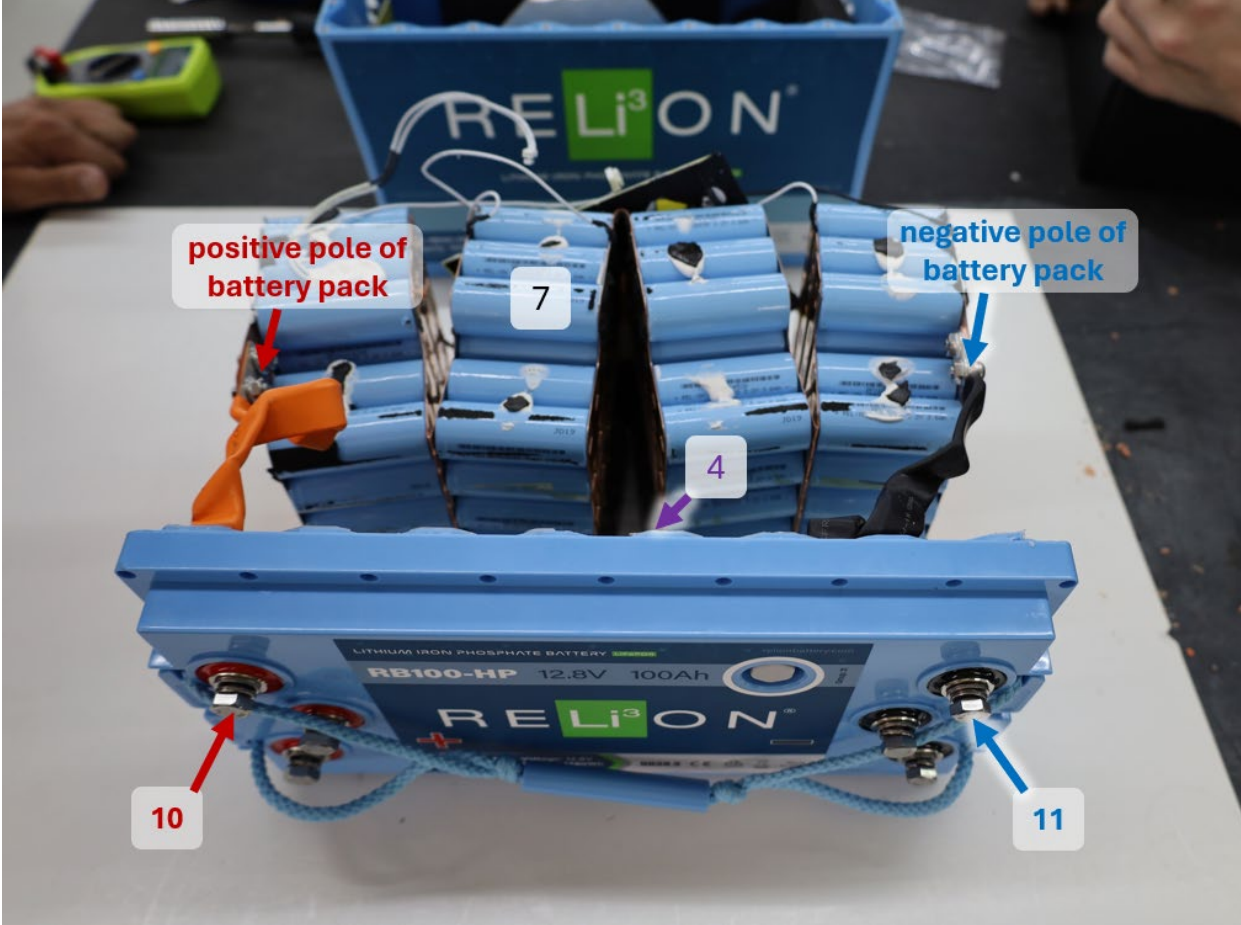
US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	
<p>[12d-iii] said parallel configuration being connected with one or more cells between the positive and negative terminals,</p>	<p>The parallel configuration of solid state switches (4) of the RELiON RB100-HP are connected with one or more cells (7) between the positive (10) and negative terminals (11).</p>

US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	 <p>The photograph shows the internal components of a Relion RB100-HP battery pack. The pack is housed in a blue plastic casing. Inside, there is a green printed circuit board (PCB) with various electronic components. A large, rectangular, light-colored battery cell is visible, with a purple outline and the number 4 pointing to it. Two metal terminals are shown: the positive pole on the left (labeled 10) and the negative pole on the right (labeled 11). A red arrow points to the positive pole, and a blue arrow points to the negative pole. A green label with the number 7 is also visible. The bottom of the casing features the Relion logo and text: "RELiON", "LITHIUM IRON PHOSPHATE BATTERY", "RB100-HP", "12.8V", "100Ah".</p>

US9,954,207 Claim Element

Relion (RELiON RB100-HP)



US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	
<p>[12e] wherein a total discharging amount of each lithium-based cell in the battery pack is from 3 Ah to 2000 Ah, and charging voltage per one cell is 2.0 to 4.2 V.</p>	<p>The total discharging amount of each lithium-based cell in the RELiON RB100-HP is from 3 Ah to 2000 Ah (e.g., 3.6Ah), and the charging voltage per one cell is from 2.0 to 4.2 V (e.g., 3.2V).</p>

US9,954,207 Claim Element	Relion (RELiON RB100-HP)
	 <p>The image consists of two photographs of a Relion RB100-HP battery pack. The left photograph shows the entire battery pack, which is a rectangular assembly of blue cylindrical cells. It has an orange strap attached to the top and yellow tape securing the sides. The right photograph is a close-up view of the battery cells, showing the labels and the arrangement. A red box highlights the text '3.2V 3.6Ah' on one of the cells, indicating the voltage and capacity of the battery pack.</p>